Space Weather Forecast

Issued on Wednesday, 26 April 2023 at 13:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor-G2/Moderate Storm risk Days 1-3 (26-28 Apr). Slight chance of M-class flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only a small number of minor Common-class flares observed. There are currently six sunspot regions on the visible disc. Two regions close together in the southeast quadrant are currently the two largest regions on the disc, although both are relatively simple. A new region rotating onto the northeastern limb may prove to be a larger region, but is too near the limb for a complete view or a proper classification. A further small region has emerged recently in the northwest and may continue to develop further in the coming hours. All other remaining sunspot regions are small and simple at present.

An eruption from the southwest quadrant beginning around 25/1900 UTC has led to a Coronal Mass Ejection (CME) which is mostly directed south and west of Earth. There is a very low chance of a glancing blow during 28 April. A further eruption around 26/0545 UTC, also from the southwest, appears directed slightly further away from Earth although assessment is ongoing.

Solar Wind / Geomagnetic Activity: The solar wind has shown elevated wind speeds perhaps due to some minor coronal hole fast wind influence. Wind speeds have varied between 490-550 km/s. The Interplanetary Magnetic Field was weak, with the north-south component mostly weakly southward directed. Geomagnetic activity has been Quiet to Unsettled (Kp 2-3).

Energetic Particles / Solar Radiation: Solar radiation has been at background levels throughout.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to remain Low, with a slight chance of reaching Moderate levels.

Solar Wind / Geomagnetic Activity: An eruption on 24 April produced a CME which may give a glancing blow at Earth in the first half of Day 2 (27 Apr). A further eruption on 25 April gave another CME which is considered most likely to miss, but there is a very low risk of a glancing blow during 28 April.

Solar wind speeds remain at elevated levels, with a coronal hole fast wind likely to arrive at Earth towards the end of Day 1 (26 Apr). Forecast wind speeds are 550-600 km/s, with an upper estimate of 650-700km/s possible by Day 2 (27 Apr). The potential arrival of the CME from 24 April could combine with the fast wind to increase the geomagnetic response. The fast wind is expected to continue at Earth into Days 3 and 4 (28 and 29 Apr), perhaps with some weakening of the winds during Day 4.

Geomagnetic activity is expected to be at Quiet to Unsettled levels through much of Day 1, increasing to Unsettled or Active with a slight chance of G1/Minor Storms (Kp5) as the fast wind arrives, then a possible further increase with the first CME giving a slight chance of a G2/Moderate Storm (Kp 6). Activity is then likely to wane through Days 3 and 4, although the risk of a further CME glancing blow on Day 3 could prolong a slight chance of G1 intervals.

Energetic Particles / Solar Radiation: Solar radiation is currently at background levels and is most likely to remain there during the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	50	20	5
Strong	G3	No	1	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	15	15	15	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	3	3
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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